Delta
Environmental
Consultants, Inc.

Solving environment-related business problems worldwide

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27141 Aliso Creek Road • Suite 270
Aliso Viejo, California 92656 USA

949.362.3077 800.477.7411
Fax 949.362.0290

August 5, 2005

Mr. Nelson Kerr
Long Beach Department of Health and Human Services
Division of Hazardous Materials
2525 Grand Avenue, Suite 222
Long Beach, California 90815

Sent via UPS

Subject: Work Plan for Initial Site Investigation
ARCO Facility No. 1602
4895 Bellflower Boulevard
Long Beach, California

Dear Mr. Kerr:

On behalf of Atlantic Richfield Company, Delta Environmental Consultants, Inc. (Delta) has prepared this work plan in response to a letter to Atlantic Richfield Company dated July 12, 2005, from the Long Beach Department of Health and Human Services (LBDHHS) concerning ARCO Facility No. 1602 (the site), located at 4895 Bellflower Boulevard in the City of Long Beach, California (Figure 1). The July 12, 2005 letter from the LBDHHS requested the submittal of a work plan to define the lateral and vertical extent of petroleum hydrocarbon impact beneath the area of soil sample P-3-4. The LBDHHS letter also requested Atlantic Richfield Company to complete a Site Characterization Permit application and to provide a $235.00 review fee. A copy of the LBDHHS letter is presented in Attachment A, the Site Characterization Permit application is presented in Attachment B, and a copy of the check to the LBDHHS for the amount of $235.00 is included in Attachment C. This work plan proposes the advancement of one soil boring in the vicinity of soil sample P-3-4.

SITE DESCRIPTION

The site is an active retail gasoline service station located on the southwestern corner of the intersection of Del Amo Boulevard and Bellflower Boulevard in the City of Long Beach, Los Angeles County, California (Figures 1 and 2). A retail center is located to the north, an active gasoline service station is located to the east, a retail center and residential homes are located to the south, and a retail center is located to the west.

SITE HISTORY

The site was formerly an active environmental case with oversight provided by the Los Angeles Regional Water Quality Control Board (LARWQCB) (Case No. 908080125). Assessments to evaluate the distribution of fuel-related hydrocarbons and oxygenates in soil and groundwater beneath the site were initiated in 1986. Assessment activities at the site included the advancement of two soil borings (BH-1 and BH-2), the installation

of 11 groundwater monitoring wells (1, 3, 5, 18, 19, 20, 21, 22, MW-25, MW-26, and MW-27), and the installation of 16 vadose-zone monitoring wells (2, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 23, and 24). In May 1996, during fuel storage and delivery system upgrade activities, ten soil samples were collected from beneath the former underground storage tanks (USTs), 11 soil samples were collected from the sidewalls of the UST excavation, eight soil samples were collected from beneath the former dispenser islands, and seven soil samples were collected from beneath the former dispenser lines. Laboratory analyses of the soil samples indicated the presence of petroleum hydrocarbons. Approximately 703 tons of petroleum impacted soil were excavated and removed from the site during station upgrade activities in May 1996. From February 16, 1995 to April 19, 1996, a vapor extraction system was operated at the site and resulted in the removal of approximately 42,200 pounds of volatile hydrocarbons. Groundwater monitoring activities were conducted at the site from October 1986 to February 2002 (IT, 2002). Regulatory case closure was granted by the LARWQCB in 2002.

On January 13, 2005, under the direction of Inspector Eric Hodder of the Long Beach Fire Department (LBFD), a Delta representative collected a soil sample from beneath each dispenser at the site (D-1-3 through D-4-3) at a depth of approximately three feet below ground surface (bgs) (Delta, 2005). On February 9, 2005, under the direction of Inspector Greg Newman of the LBFD, a Delta representative collected a soil sample from beneath the product piping adjacent to each dispenser (P-1-4, P-2-4, P-6-4, and P-7-4) at a depth of approximately four feet bgs. Laboratory analysis of soil samples collected from beneath the dispensers and piping in the northern dispenser island (D-3-3, D-4-3, P-6-4, and P-7-4) indicated no detectable concentrations of total petroleum hydrocarbons as gasoline (TPHg), benzene, toluene, ethylbenzene, total xylenes (BTEX collectively), methyl tertiary butyl ether (MTBE), di-isopropyl ether (DIPE), ethyl tertiary butyl ether (ETBE), tertiary amyl methyl ether (TAME), tertiary butanol (TBA), or ethanol. Laboratory analysis of soil samples collected from beneath the dispensers and piping in the southern dispenser island (D-1-3, D-2-3, P-1-4, and P-2-4) indicated low detectable concentrations of TPHg, toluene, ethylbenzene, xylenes, MTBE, TBA, and ethanol in soil samples D-1-3, D-2-3, and P-2-4 (Delta, 2005).

During the 2005 dispenser and piping upgrade activities, unidentified, out of service, steel piping was discovered, and the LBFD inspector requested that the piping be chased, uncovered, and removed. On February 9, 2005, under the direction of Inspector Greg Newman of the LBFD, a Delta representative collected five soil samples beneath the abandoned steel pipe (P-3-4, P-4-3, P-5-3, P-8-3, and P-9-3). Soil sample P-3-4 was collected at a depth of approximately four feet bgs and soil samples P-4-3, P-5-3, P-8-3, and P-9-3 were each collected at a depth of approximately three feet bgs. The abandoned steel piping was removed from the site after soil samples were collected. Laboratory analysis of soil samples collected from beneath the abandoned steel piping locations (P-3-4, P-4-3, P-5-3, P-8-3, and P-9-3) indicated detectable concentrations of TPHg, BTEX, and MTBE in soil sample P-3-4. Toluene was detected in soil sample P-4-3, ethylbenzene was detected in soil sample P-3-4 and P-4-3, xylenes were detected in soil samples P-3-4, P-4-3, and P-5-3 (Delta, 2005). After receipt and review of soil analytical results, it was determined that an Underground Storage Tank Unauthorized Release Report (URR) would be submitted. BP West Coast Products LLC submitted the URR to the LADPW on February 1, 2005.

Recent soil sample analytical results are summarized in Table 1 and soil sample, well, and soil sample locations are shown on Figure 2.

SITE GEOLOGY/HYDROGEOLOGY/NEARBY PRODUCTION WELLS

The site is located in the central portion of the Los Angeles Basin, approximately 1.5 miles west of the San Gabriel River. In the site vicinity, the underlying soil consists of Holocene alluvium to a depth of approximately 25 feet. The alluvium is underlain by sediments of the Lakewood and San Pedro formations of Pleistocene age

that occur to depths of approximately 300 and 1,300 feet below ground surface (bgs), respectively (CDWR, 1961).

The site is located approximately 0.5 miles northeast of the Los Alamitos fault. The Los Alamitos fault trends northwest to southeast and vertically offsets San Pedro formation sediments by approximately 180 feet, but does not displace the younger, Lakewood sediments (CDWR, 1961). Hence, the fault acts as a barrier to groundwater flow in aquifers of the San Pedro formation, but does not affect Lakewood formation aquifers.

The site is located in the medial portion of the Central Basin Pressure Area, within the Central Groundwater Basin of the Los Angeles County Coastal Plain. The primary water–bearing sediments occur in the Lakewood and San Pedro formations. The uppermost water-bearing sediments are present in upper Lakewood formation known as the Semiperched aquifer, which occur at a depth of approximately 25 to 80 feet bgs (CDWR, 1961). These sediments are underlain by the Exposition and Gauge aquifers, which extend to a depth of approximately 200 feet bgs.

A groundwater contour map developed by the Los Angeles County Department of Public Works (LACDPW, 1990) indicates regional groundwater flow in the deep aquifer system to the southwest in the site vicinity. LACDPW municipal well No. 975A is located 1,200 feet southeast of the site and screened from 367 to 388 feet bgs. Based on historical information obtained from groundwater monitoring wells, the groundwater gradient in the shallow aquifer underlying the site is predominantly to the south-southwest at 0.003 foot per foot. Depth to groundwater at the site is approximately 25 feet bgs.

PROPOSED SCOPE OF WORK

In order to assess the lateral and vertical extent of petroleum hydrocarbon and fuel oxygenate concentrations in the vicinity of soil sample P-3-4, Delta proposes the following scope of work:

Task 1: Project Initiation

- Prepare a site-specific Health and Safety Plan. A copy of the Health and Safety Plan will be on site during all Delta-monitored field events.

- Mark the proposed boring location shown on Figure 2, and notify Underground Service Alert and Atlantic Richfield Company of the scheduled field activities.

- A private utility locating company will be contracted to locate underground utilities on site prior to the initiation of drilling.

Task 2: Field Activities

- Advance one angle soil boring at the location shown on Figure 2. The boring will be advanced at a 25-degree angle from vertical. The proposed location of the soil boring was selected to assess the extent of concentrations detected in soil sample P-3-4 collected from beneath the abandoned steel pipe in February 2005. The initial 5-feet of the boring will be advanced using an air knife rig to reduce the potential for damaging underground improvements. The soil boring will be advanced past the initial five feet using a truck-mounted hollow-stem auger-drilling rig.

- The boring will be advanced to 20 feet bgs. However, if petroleum hydrocarbon concentrations are detected in soil samples, as determined by on-site field screening with a photo-ionization detector (PID), then the soil boring will be advanced to groundwater (approximately 25 to 30 feet bgs). Upon reaching

terminal depth, the soil boring will be backfilled with bentonite grout and topped with concrete to match the existing ground surface.

- If groundwater is encountered in the soil boring, a grab groundwater sample will be collected using a new disposable bailer. The groundwater sample will be transferred to laboratory-supplied glassware, sealed, labeled, identified on a chain-of-custody form, and placed in a chilled cooler pending delivery to the analytical laboratory. Chain-of-custody procedures will be followed from the time the sample is collected until the time it is relinquished to the laboratory.

- Soil samples will be collected at 5-foot intervals from five feet bgs to the terminal depth during the drilling of the soil boring. The samples will be collected using a modified California-type, split-spoon sampler. Soil samples for chemical analyses will be collected from the split-spoon sampler using new, factory cleaned and sealed EnCore™ samplers according to Environmental Protection Agency (EPA) Method 5035. Prior to initiating the sampling and between each sampling event, all sampling equipment will be washed with a phosphate-free detergent and water solution and double rinsed with deionized water. The EnCore™ samples will be sealed, labeled, identified on a chain-of-custody form, and placed in a chilled cooler pending delivery to the analytical laboratory. Chain-of-custody procedures will be followed from the time the samples are collected until the time they are relinquished to the laboratory. Soil remaining in the split-spoon sampler will be field screened using a PID, used for soil classification, and will be noted on the soil boring log.

- Soil cuttings and decontamination water generated during boring activities will be placed in Department of Transportation-approved, 55-gallon, metal drums and stored on-site pending off-site disposal.

Task 3: Laboratory Analysis

- Submit soil samples and any groundwater samples collected to a California Department of Health Services-certified laboratory, for analysis. All samples collected will be analyzed for TPHg according to EPA Method 8015 Modified and for BTEX, MTBE, DIPE, ETBE, TAME, TBA, and ethanol according to EPA Method 8260B.

Task 4: Report Preparation

- Prepare a summary report of field activities and analytical results for submittal to the LBDHHS.

SCHEDULE

Upon review and approval of this work plan by the LBDHHS, Delta will schedule the field activities. Dependent upon equipment availability, the field activities may require up to one month to complete. Delta expects to receive the final laboratory reports of the sample analyses approximately two weeks after sample submittal. After receiving the final laboratory reports, approximately six weeks will be required to prepare and submit the final report.

REMARKS AND SIGNATURES

The recommendations contained in this report represent Delta's professional opinions based upon the currently available information and are determined in accordance with currently acceptable professional standards. This report is based upon a specific scope of work requested by the client. The Contract between Delta and its client outlines the scope of work, and only those tasks specifically authorized by that contract or outlined in this report were performed. This report is intended only for the use of Delta's Client and anyone else specifically listed on

this report. Delta will not and cannot be liable for unauthorized reliance by any other third party. Other than as contained in this paragraph, Delta makes no express or implied warranty as to the contents of this report.

If you have questions or comments regarding this work plan, please contact Amy Mora at (949) 360-5789.

Sincerely,
DELTA ENVIRONMENTAL CONSULTANTS, INC.

Prepared by:

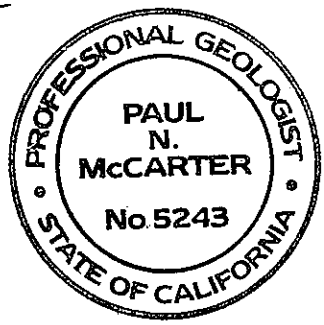
Amy Mora
Project Manager

8/5/05
Date

Reviewed by:

Paul N. McCarter, P.G.
California Professional Geologist No. 5243

8-5-05
Date



Attachments:

	Figure 1	Site Location Map
	Figure 2	Site Map
	Table 1	Historical Soil Sample Analytical Results
	Attachment A	City of Long Beach Letter Dated July 12, 2005
	Attachment B	Site Characterization Permit Application
	Attachment C	Copy of $235.00 Permit Fee Check

cc: Mr. Darrell Fah, Atlantic Richfield Company, La Palma, California

(q:\bpwest\socal\1602\wpisi.doc)

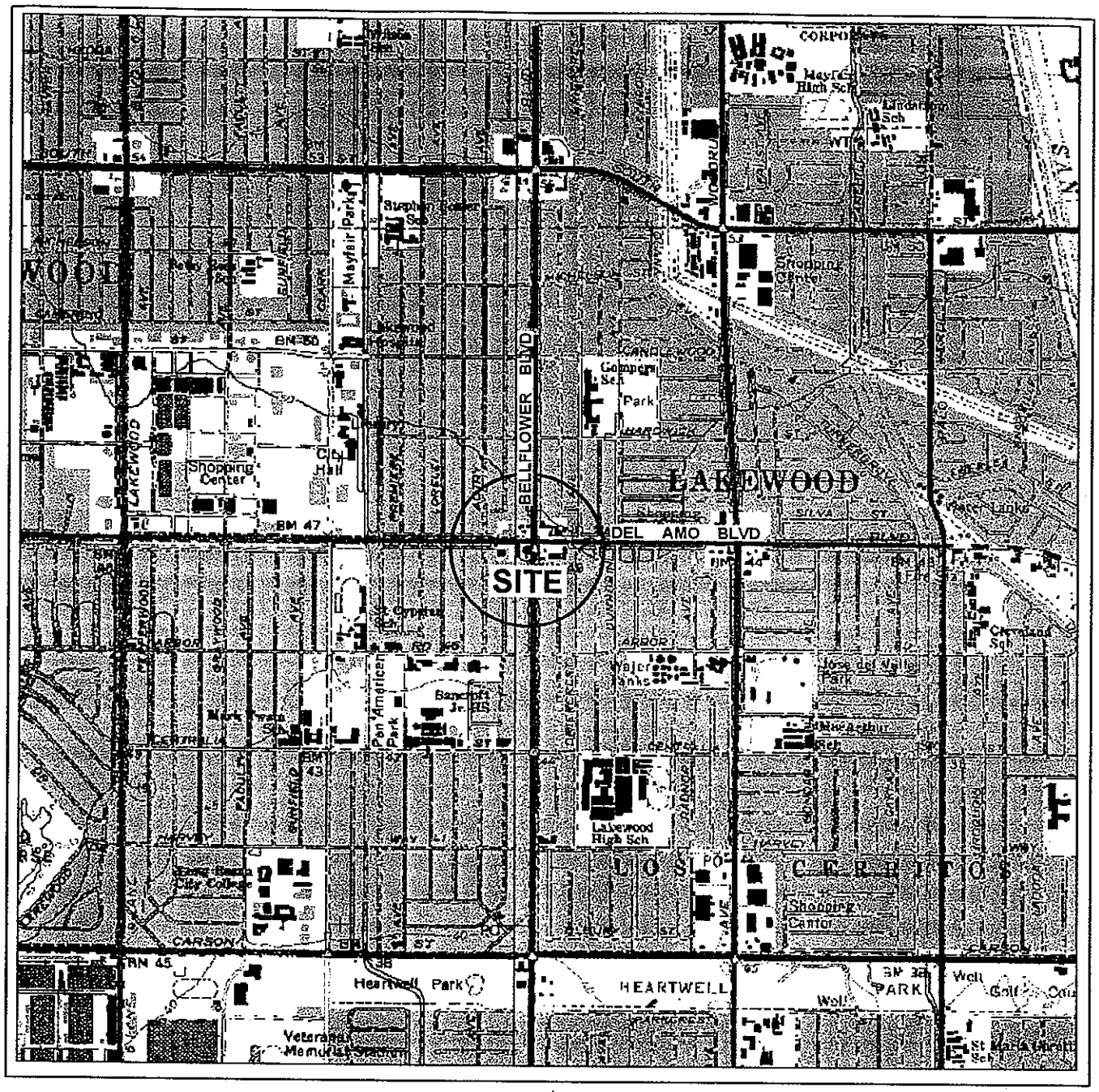
REFERENCES

California Department of Water Resources (CDWR, 1961), Planned Utilization of Ground Water Basins of the Coastal Plain of Los Angeles County, Appendix A; Ground Water Geology: CDWR Bulletin 104-2.

Delta Envrionmental Consultants, Inc. (Delta, 2005), Soil Sampling Report, dated March 28, 2005.

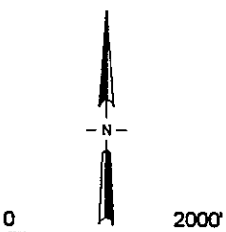
IT Corporation, (IT, 2002), First Quarter 2002 Groundwater Monitoring Report, dated April 8, 2002.

Los Angeles County Department of Public Works, (LACDPW, 1990), Hydrologic Report 1988-89: Deep Aquifer Ground-Water Contour Map, Coastal Plain, scale 1 inch = 1 mile.



GENERAL NOTES:
BASE MAP FROM U.S.G.S.
LOS ALAMITOS AND LONG BEACH, CA. QUADRANGLE
7.5 MINUTE TOPOGRAPHIC MAP
1964
PHOTOREVISED 1981

QUADRANGLE LOCATION



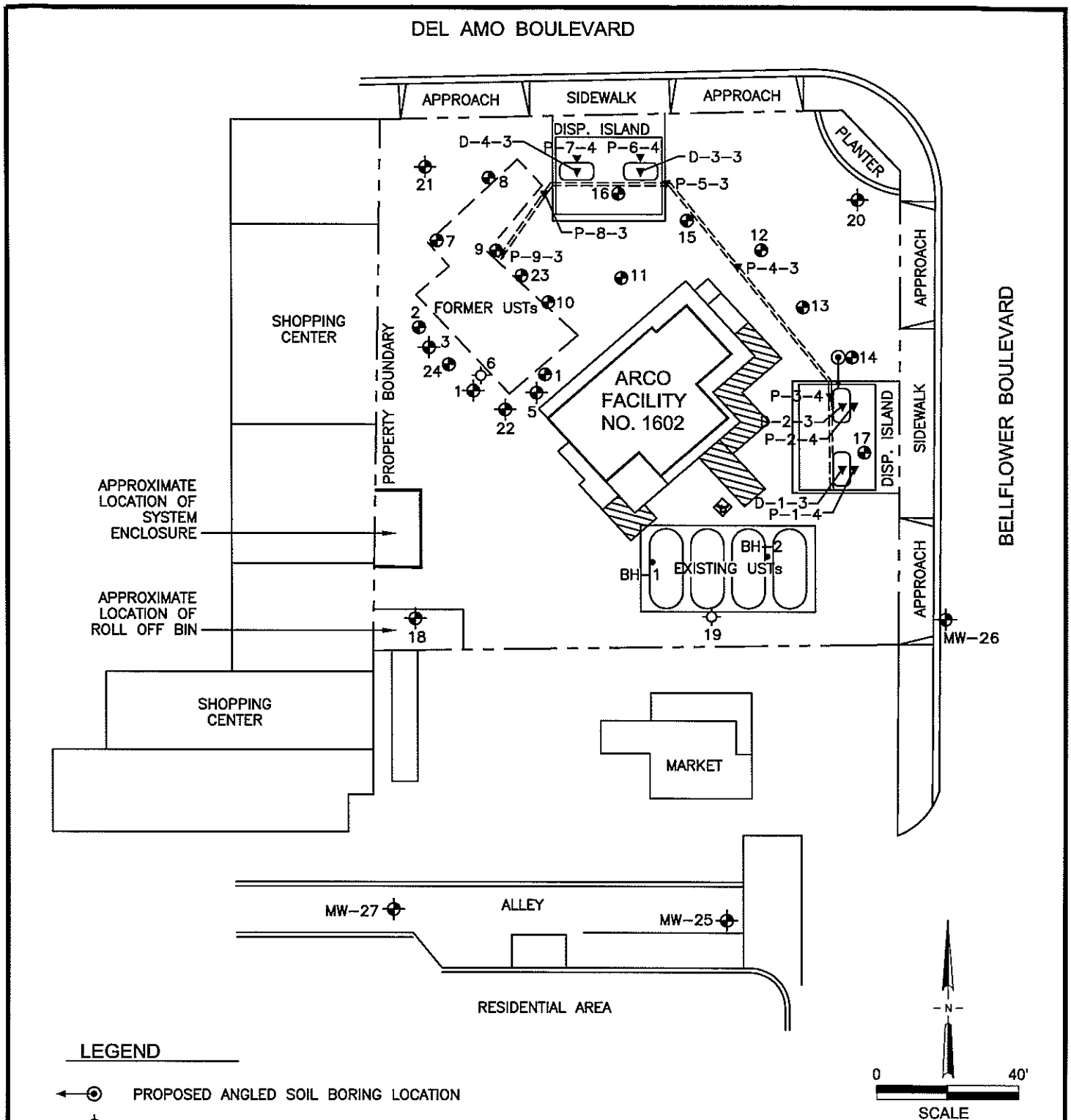
SCALE

FIGURE 1

SITE LOCATION MAP
ARCO FACILITY NO. 1602
4895 BELLFLOWER BOULEVARD
LONG BEACH, CA.

PROJECT NO. 05100		DRAWN BY K. MARTIN	
FILE NO. 1602-002		PREPARED BY S. PEACHER	
DATE 25 FEB 05	REV. 0	REVIEWED BY	

Delta Environmental Consultants, Inc.



LEGEND

←⊕	PROPOSED ANGLED SOIL BORING LOCATION
MW-26 ⊕	GROUNDWATER MONITORING WELL LOCATION
17 ⊕	VADOSE ZONE MONITORING WELL LOCATION
BH-2 •	SOIL BORING LOCATION
19 ⊖	ABANDONED WELL LOCATION
P-9-3 ▼	PIPING SOIL SAMPLE LOCATION
D-2-3 ▼	DISPENSER SOIL SAMPLE LOCATION
======	ABANDONED STEEL PIPING LOCATION
UST	UNDERGROUND STORAGE TANK

FIGURE 2
SITE MAP
ARCO FACILITY NO. 1602
4895 BELLFLOWER BOULEVARD
LONG BEACH, CA.

PROJECT NO. G09XT	DRAWN BY K. MARTIN	A B D	
FILE NO. 1602-001	PREPARED BY A. MORA		
DATE 25 JUL 05	REV. 0	REVIEWED BY	

Delta Environmental Consultants, Inc.

TABLE 1
HISTORICAL SOIL ANALYTICAL RESULTS
ARCO Facility No. 1602
4895 Bellflower Blvd.
Long Beach, CA

Sample I.D.	Date Sampled	Sample Depth	TPHg (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-Benzene (mg/kg)	Xylenes (mg/kg)	MTBE (mg/kg)	DIPE (mg/kg)	ETBE (mg/kg)	TAME (mg/kg)	TBA (mg/kg)	Ethanol (mg/kg)
D-1-3	1/13/2005	3	ND<0.25	ND<0.0020	0.0028J	ND<0.0020	0.012	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	2.5
D-2-3	1/13/2005	3	7.2	ND<0.0018	ND<0.0018	0.0029J	0.095	0.041	ND<0.0045	ND<0.0045	ND<0.0045	ND<0.018	ND<0.091
D-3-3	1/13/2005	3	ND<0.25	ND<0.0020	ND<0.0020	ND<0.0020	ND<0.0020	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	ND<0.10
D-4-3	1/13/2005	3	ND<0.30	ND<0.0020	ND<0.0020	ND<0.0020	ND<0.0020	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	ND<0.10
P-1-4	2/9/2005	4	ND<16	ND<0.0020	ND<0.0020	ND<0.0020	ND<0.0020	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	ND<0.10
P-2-4	2/9/2005	4	0.45J	ND<0.0025	ND<0.0025	ND<0.0025	ND<0.0025	0.030	ND<0.0050	ND<0.0062	ND<0.0062	0.97	ND<0.12
P-3-4	2/9/2005	4	2200	2.4J	32	27	170	15	ND<2.8	ND<2.8	ND<2.8	ND<11	ND<560
P-4-3	2/9/2005	3	ND<0.25	ND<0.0020	0.0059	0.0068	0.055	ND<0.0068	ND<0.0068	ND<0.0050	ND<0.0050	ND<0.020	ND<0.10
P-5-3	2/9/2005	3	ND<0.25	ND<0.0020	ND<0.0020	ND<0.0020	0.0026J	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	ND<0.10
P-6-4	2/9/2005	4	ND<0.43	ND<0.0023	ND<0.0023	ND<0.0023	ND<0.0023	ND<0.0050	ND<0.0057	ND<0.0057	ND<0.0057	ND<0.023	ND<0.11
P-7-4	2/9/2005	4	ND<0.25	ND<0.0020	ND<0.0020	ND<0.0020	ND<0.0020	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	ND<0.10
P-8-3	2/9/2005	3	ND<0.25	ND<0.0020	ND<0.0020	ND<0.0020	ND<0.0020	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.020	ND<0.10
P-9-3	2/9/2005	3	ND<0.42	ND<0.0027	ND<0.0027	ND<0.0027	ND<0.0027	ND<0.0068	ND<0.0068	ND<0.0068	ND<0.0068	ND<0.027	ND<0.14
SP-1	1/13/2005	NA	2.6	ND<0.13	ND<0.13	0.21J	1.5	ND<0.33	ND<0.33	ND<0.33	ND<0.33	ND<1.3	ND<66

Notes: EPA = Environmental Protection Agency

mg/kg = Milligrams per kilogram

TPHg = Total petroleum hydrocarbons as gasoline

MTBE = Methyl tert-butyl ether

DIPE = Di-isopropyl ether

ETBE = Ethyl tertiary butyl ether

TAME = Tertiary amyl methyl ether

TBA = Tertiary butanol

ND<number = Not detected at or above stated laboratory reporting limit

NA = Not analyzed

J = Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL).

TPHg analysis by EPA 8015 Modified

Benzene, Toluene, Ethylbenzene, Xylenes, MTBE, DIPE, ETBE, TAME, TBA, and Ethanol analyses by EPA 8260B

ATTACHMENT A

City of Long Beach Letter Dated July 12, 2005

CITY OF LONG BEACH

DEPARTMENT OF HEALTH AND HUMAN SERVICES
CERTIFIED UNIFIED PROGRAM AGENCY

2525 GRAND AVENUE • LONG BEACH, CALIFORNIA 90815 • 562/570-4131

JUL 19 2005

Keith

July 12, 2005

Mr. Darrell Sah
BP Arco
6 Center Point Drive
La Palma, California 90623-1066

Regarding: 4895 Bellflower Boulevard, Long Beach, California
ARCO Station #1602

Dear Mr. Sah:

The Long Beach Department of Health and Human Services has received the required soil sampling report for the removal of four (4) dispensing units and piping systems indicating that a discharge of hazardous material has been identified where soil sample P-3-4 was obtained at the above referenced location.

In order to comply with the State of California Underground Storage Tank Regulations, and the Long Beach City Ordinance for Hazardous Materials Cleanup, it is required that you submit both an application for a Site Characterization Permit and a Site Characterization Work Plan to this Office.

Enclosed are the Site Characterization Guidelines that include a Site Characterization Permit application. The Long Beach City Council has established a permit fee for the Department of Health and Human Services' personnel time involved with this project. You will be billed for the permit before it can be issued.

The permit application process is to be completed by August 7, 2005. Following a site characterization, the next phase may be a site remediation or clean up. If a site remediation is required, a permit must be obtained from this office.

You should also be aware of the South Coast Air Quality Management District's Rule 1166 regarding volatile organic compound (VOC) emissions from contaminated soil. If you are going to treat or handle VOC-contaminated soil, you must notify the South Coast Air Quality Management District by telephone within 24 hours of detection of VOCs in soil and comply with their requirements.

If you require additional information, please contact Hazardous Materials Specialist, Carmen Piro, between the hours of 8:00 am - 9:00 am and 4:00 pm - 5:00 pm, Monday thru Friday at 562/570-4137.

Sincerely,

Nelson Kerr, R.E.H.S., M.P.A.
Hazardous Waste Operations Officer

cc: Long Beach Fire Prevention
Delta Environmental Consultants, Inc.

ATTACHMENT B

Site Characterization Permit Application

ATTACHMENT I

CITY OF LONG BEACH DEPARTMENT OF HEALTH AND HUMAN SERVICES
LONG BEACH/SIGNAL HILL UNIFIED PROGRAM AGENCY

SITE CHARACTERIZATION PERMIT APPLICATION

SITE LOCATION: ARCO Facility No. 1602 -
4895 Bellflower Boulevard, Long Beach, CA

NAME OF BUSINESS: ARCO Facility No. 1602

NAME OF OWNER/OPERATOR: Atlantic Richfield Company

TELEPHONE NUMBER: (714) 378-5105

MAILING ADDRESS: 4 Centerpointe Drive, La Palma, CA 90623

CONTACT NAME IF DIFFERENT FROM OWNER/OPERATOR: Mr. Darrell Fah

TELEPHONE NUMBER: (714) 378-5105

MAILING ADDRESS: 4 Centerpointe Drive, La Palma, CA 90623

NAME OF SELECTED ENVIRONMENTAL CONSULTANT: Delta Environmental Consultants, Inc.

TELEPHONE: (949) 360-5789

ADDRESS: 27141 Aliso Creek Road, Suite 270, Aliso Viejo, CA 92656

Name of Owner/Operator approving Site Characterization project: Mr. Darrell Fah

Signature: D. Darrell Fah

Date: 7/29/05

This Section for official use

Assigned Hazardous Materials Specialist(s) _____

Date when Permit Application was received: _____

Remarks: _____

ATTACHMENT C

Copy of $235.00 Permit Fee Check

MP

469414

Delta Environmental Consultants, Inc.

5910 Rice Creek Parkway, Ste 100
Shoreview, MN 55126
651/639-9449

WELLS FARGO BANK MONTANA, N.A.
175 NORTH 27TH STREET
BILLINGS, MT 59101
93-527/929

469414

7/22/2005

PAY **********235 DOLLARS AND**********00 CENTS **$**********235.00

Details on back.

TO THE ORDER OF
CITY OF LONG BEACH
333 W. Ocean Blvd, 4th Floor
LONG BEACH, CA 90802 US

AUTHORIZED SIGNATURE

MLM500-IR 0200263653001 McGEE 1 800 662-2331 00009139200

⑈469414⑈ ⑆092905168⑆ 4900060599⑈